Improving Methodologies of Assessing the Efficiency of Agricultural Land Use

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Abstract—The article is devoted to the problem of the search and generalization of the values, which allow making an objective assessment of the efficiency of agricultural land use. For the whole period of the existence of humankind land resources have been the basic condition of its survival and further evolution, as they are a natural platform of production of all material goods. The final values of the work of agrarian sphere are in dependence to the efficiency of agricultural land use, being both the subject and the means of labor for agricultural organizations and enterprises. Nowadays the question of the efficiency of agricultural land use has been studied widely, but the importance of the further research and the improvement of this aspect remains, as the stability of the agricultural production is directly proportional to the presence and efficiency of the agricultural landholdings use. However, for the improvement of the efficiency and results rating of land use in the agricultural sector it is necessary to use the systematic approach, implying the application of the methodology of its assessment on the basis of generalizing, complex, integral value, used as a consequence as the assessment criterion to build the rating of the agribusiness organizations of the region with the aim of making reasonable management decisions. The materials of this research are the data of annual fiscal (accounting) statements of agricultural producers of the Kurgan region, being in published sources and on the official sites, as well as the materials provided to the authors upon their request. In the conducted study such methods have been used as the analysis and comparison, methods of generalization and statistical analysis. While writing this article, economic statistical analysis of the agricultural land use of Zauralie has been carried out. Moreover, the algorithm of rating construction of households with the aim of effective agricultural land use has been elaborated. The innovation of the research is in the fact that the questions of the improvement of efficiency and results rating of land use in the agriculture have been studied on the basis of systematic approach, implying the application of the methodology of its assessment of generalizing, complex, integral value; the necessity of the use of the complex integral value of economic efficiency of agricultural land use is stated as the assessment criterion to build the rating of agribusiness organizations of the region with the aim of making reasonable management decisions; the influence of economic efficiency of agricultural land use on the financial results of activity of agro-organizations is shown.

Keywords—agricultural producers, agriculture, economic efficiency, agricultural landholdings, complex integral value, land resources, Kurgan region.

I. INTRODUCTION

One of the most important problems, put for agricultural producers, is the improvement of the efficiency of agricultural land use. In modern times the efficiency question is not new, as it has been existing since the origin of the material production. The effect from the use of land resources is defined by the comparison of the production results (in terms of the used land area) and the cost of the gross production (the cost of its production). But again, it is impossible not to take into account the specificity of this resource (limitation in sizes, long period of recovery and etc.), consequently, the assessment of returns of land resource use will differ from the similar process in relation to other kinds of production resources.

It should not be forgotten that agricultural lands completely consist of lands of agricultural designation, that is why it is necessary to single out the criteria, which will help to rank landholdings as lands of agricultural designation, namely: the location of landholding outside of towns and villages; the use of land for the agricultural production; the result of the use of landholdings should be the income-generation from the realization of the received agricultural production; suitability for the use as the basic means of the manufacture of agricultural production.

The main function of agricultural landholdings is making agricultural production and, as a consequence, the supply of food safety of the country. So, the results rating of agricultural production is in dependence to returns from the land use. The financial returns from the application of lands of agricultural designation is a combination of characteristics, describing the effectiveness of the process of the manufacture of agricultural production with regard for the amount of the received state help by the agricultural producers an incurred costs of production [1,2].

II. LITERATURE REVIEW

It is necessary to start the research from the definition of the object of the study, i.e. the notion "agricultural landholdings". The current Land Code of the Russian Federation divides land resources into the following categories depending on their designation, namely: "lands of agricultural designation, lands of settlements, lands of industry, energy production, transport, communication, radiobroadcasting, television broadcasting, information science, lands for insurance space activity, lands of defense,

safety and lands of other special designation; lands of specially defended territories and objects; lands of forest reserve; lands of water reserve; undistributed lands".

The lands of agricultural designation are of a great attention and interest for the agricultural production as they are the basis of agro-business development. Moreover, the Land Code of the Russian Federation shows directly that these landholdings are situated outside settlements and thus it is necessary to distinguish them from the lands of so-called agricultural application in the settlements themselves. This division allows arriving at the assessment of the efficiency of agricultural resources in the agricultural production accurately and fully and therefore at the disclosure of possible directions of the increase of returns of their use by agro-organizations. Nowadays the Land Law of the Russian Federation proceeds from the premise that "agricultural landholdings" and "lands (zones) of agricultural use" are in no way considered to be equivalent. In the first case, it is about the share of land resources of the country which was divided into a separate group for intended use. In the other understanding landholdings from lands of other categories, used as agricultural landholdings for the main goals of the activity of the economic entity, are covered in the assessment. So, in compliance with p.11 art. 85 of the Land Code of the Russian Federation "…landholdings with tilled fields, perennial plantings, buildings, constructions and structures of agricultural designation, used for agricultural production, are assigned to the lands of agricultural use in settlements" [3].

In the Russian economic scientific literature the approaches of authors to the definition of the notion "lands of agricultural designation" have remained practically unchanged for several decades. For example, I.A. Minakov, V.A. Dobrynin, A.A. Nikitenko and N.Ya. Kovalenko assign the territories of collective, state farms, subsidiary, educational and experimental farms, that are used with the aim of the manufacture of agricultural production, to agricultural land resources. This group may include arable lands, gardens, hayfields, vineyards and pasture lands [4-7]. N.T. Nazarenko, R.A. Alborov and S.R. Kontsevaya include only agricultural landholdings into this group. Therewith, N.T. Nazarenko considers such territory as agricultural landholdings that gives production (vineyards, arable land, pasture land, berry plantation, gardens), hayfields and so on, while R.A. Alborov and S.R. Kontsevaya assign such lands that "…bring financial gain from their economic use…" [8,9] to agrarian land use. S.M. Degtyareva includes "… landholdings, given to different agricultural organizations as well as to citizens for keeping peasant (farm) and (or) personal subsidiary plots, horticulture, gardening, kettle breeding, haymaking and pasturage of farm animals" into the group of lands of agricultural designation [5].

Today, while assessing the economic efficiency of land resource use, several various methodologies are used by agrarians at once. For example, N.P. Kastornov, I.A. Minakov, V.A. Dobrynin, N.Ya. Kovalenko, O.F. Lopatina, S.M. Degtyareva, L.B. Vinnichek, V.N. Yashkina understand this question as the level of production management, "…which is characterized by the number of products received per unit area …" [11, 12, 13]. In A.A.Nikitenko's opinion, economic efficiency of agricultural land use has the opportunity to manifest itself through the system of characteristics, describing as "…the returns from the use of all land resources, attached to the farm, and the efficiency of

agricultural land use and some of their types as well…" [4]. O.N. Kusakina and L.V. Alexeeva consider the social economic efficiency of land use as "… the efficiency of the process of agricultural production providing for the preservation and promotion of land capability with the aim of improvement of the economic potential of the region and the country, the level and the quality of people's lives, the realization of land use right of people, the creation of criteria for strengthening national safety of the country…" [14].

Summarizing the above, it may be said that to the lands of agricultural designation we should assign landholdings, situated outside settlements, used by the owners and users for the manufacture of agricultural production with the aim of reaping the benefits and also able to maintain land capability while using the land rationally. At the same time the lands of agricultural designation include landholdings out of lands, not belonging to the lands of agricultural designation, situated in this case within the borders of the settlement and used by the citizens for the manufacture of agricultural production with the aim of meeting the demand of food rations and (or) receiving the material benefits from the sale of the surplus.

III. METHODOLOGY

The research methodology is based on the core principles of systematic approach to the study of the questions of the effectiveness of agrarian land use and the combination of the applied methods of the assessment of the efficiency of agricultural land use.

From this point of view, the assessment of the economic efficiency of the land use by agrarian organizations on one value is very attractive as this will allow ranking all the organizations in dependence to its amount. In addition, all the system of characteristics serves as the basis for the construction of the generalizing (integral) value of the economic efficiency of agricultural land use. Consequently, the integral value will become suitable for the assessment, using some values at a time and allowing analyzing more than one condition. The considered value includes particular characteristics of the economic efficiency of the exploitation of land resources by the producers of agrarian goods in the form of separate assessment criteria.

This article considers the methodology of the assessment of the efficiency of agricultural landholdings use, the idea of which is in the scientific assumption that the increase of the efficiency of land use in agro-business is possible only on the basis of the objective and full assessment on the ground of complex integral value. Such an assessment will allow:

- making a wider and more understandable description of the efficiency of land resources use, as all the groups of estimated values will be used at a time to calculate the complex value;

- forming the household rating on the land efficiency, based on the calculations of the complex value for several organizations;

- giving this assessment the maximum possible objective character, as for the construction of the complex value the average numbers of assessment values for 5 years are used.

From this point of view, the method proposed by V.M. Trotsenko, is of interest, he suggested the calculation of the integral value of the efficiency of lands of agricultural

designation on the basis of "the system of natural and monetary characteristics, reflecting the state of lands of agricultural designation and the efficiency of the agricultural production in a concrete sphere" [15]:

$$Z = \sum_{j=1}^{m} a_j I_j / m \qquad (1)$$

where Z - is an integral value of the efficiency of the use of agricultural landholdings;

I_j – is j-amount of the value of the efficiency of the use of agricultural landholdings;

a_j – is a weight coefficient, defining the significance of this or that value;

m – is the number of values, chosen for the assessment.

Consequently, the integral value will become suitable for multicriteria assessment and will include particular characteristics of the economic efficiency of land use by agricultural organizations in the form of separate values.

Medvedeva T.N. and Artamonova I.A. propose the following model of the calculation of the similar value [16, 17]:

$$CIV_{eal} = \sum_{i=1}^{n} w_i x_i \qquad (2)$$

where CIV_{eal} - is a complex integral value of the efficiency of the use of agricultural landholdings, shares;

w_i – is a coefficient, taking into account the significance of I of the value of the efficiency of the use of agricultural landholdings;

x_i – is the significance of i of the value of the efficiency of the use of agricultural landholdings.

Then the integral value in terms of each agricultural producer is defined in the context of separate groups of assessment criteria (natural – group 1, monetary – group 2, relative – group 3) [1,16,17]:

$$CIV_{eal} = \frac{CIV_{eal.nat.} \times CIV_{eal.mon.} \times CIV_{eal.rel.}}{1000000} \qquad (3)$$

where $CIV_{eal.nat}$, $CIV_{eal.mon.}$, $CIV_{eal.rel.}$ - is a complex integral value of the efficiency of the use of agricultural landholdings according to the corresponding group of the assessment values;

1000000 - is a correction coefficient, decreasing the dimension of the integral value.

IV. RESULTS

The qualitative assessment of the influence of the land use is necessary for owners and users of agricultural lands to define the production potential and to develop measures on the increase of the influence of their use. It should be noted that this will lead to the increase of the manufacture of agricultural production and will promote the increase of industrial productivity, the possibility of choice of more profitable development directions for agricultural producers, which provide for the land capability and logistics of the land use.

The available ways of complex assessment of the effectiveness and efficiency of the agrarian land use can be improved, using the ranking of the integral value of the economic efficiency of the use of agricultural landholdings, calculated on the basis of the data of the annual statements of agricultural organizations and the figures of factor review [16-18].

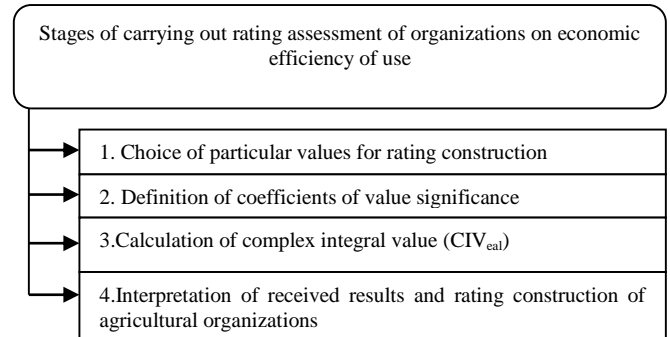The order of carrying out such an assessment is presented in picture 1.

Fig. 1. Stages of construction of rating assessment of agricultural producers.

The system of ranking of the value of economic efficiency of agricultural landholdings use, proposed in this article, guarantees necessary information help to take management decisions for optimal and profitable functioning of agro-production. The carrying-out of a similar assessment allows conducting relative analysis of financial returns of land use of separate agricultural producers as well as of municipalities and entities of the Russian Federation.

The practical significance of the application of the unique generalizing value in the analysis of the efficiency of the use of agricultural landholdings is in the fact that it accumulates particular assessment criteria from the point of view of influence of different factors [13].

V. RESULTS OF EXPERIMENTAL RESEARCHES

To make the result of the assessment of the efficiency of agricultural land use a real working tool for production management and financial control of the economic entity, it is necessary to create factual ways of its calculation, which could be used in everyday life of economists. As a result of this, the necessity arises to introduce a complex value into the calculations, which will allow conducting relative analysis among agrarians, taking into account a huge part of the characteristics, describing the effectiveness of the land use.

The assessment of the efficiency of agricultural landholdings use should be carried out only after getting an average complex integral value in the analyzed region. At the next stage the comparison of the average regional amounts of the studied assessment criterion with separate economic entities of the industry is conducted. With this aim the calculation of integral values is carried out for all the agricultural producers, included into sample frame, and then by comparing the received calculated amounts the rating of the economic efficiency of land resources use is formed [19].

It is necessary to note that the land use in agricultural production will be ineffective if the calculated amount of the complex integral value of the concrete organization is lower than the average of the region, calculated for the similar research period. At the same time, the maximum amount of

the complex integral value is taken to be equal to its maximum amount of the studied sample frame [1,16-19].

VI. CONCLUSION

The calculation of the complex integral value allows grouping the organizations with the aims of the analysis of the influence of the economic efficiency of the exploitation of agricultural landholdings on business activity of economic entities (table 1).

After grouping we see that those agricultural producers have the highest results of activity, who enter group four and have the amount of the complex integral value of over 91.74 scores.

TABLE I. INFLUENCE OF THE ECONOMIC EFFICIENCY OF THE USE OF AGRICULTURAL LANDHOLDINGS ON FINANCIAL RESULTS OF AGRICULTURAL ORGANIZATIONS

Value	Complex integral value of economic efficiency of use of agricultural landholdings, score			
	up to 30.58	30.58-61.16	61.16-91.74	higher than 91.74
Number of organizations in group, units	39	7	2	2
Average amount of complex integral value, score	14.53	40.83	72.04	115.29
Produced agricultural production, RUB, in thousands				
- in goods	33027.21	33418.94	25569.80	65471.40
- gross product	32273.15	28906.83	30632.70	69484.80
Costs of main production, RUB, in thousands	49996.29	45880.57	48140.50	84167.30
Net profit, RUB, in thousands	1454.05	6421.09	871.10	8735.60
Rentability, %:				
- of costs	6.80	18.70	2.56	11.78
- of sales	5.25	15.39	2.87	12.32

The practical significance of the elaboration of the complex integral value of the assessment of the efficiency of the agrarian land use is in the fact that it allows uniting particular criteria (as such values any at option out of accepted ones are proposed), describing and characterizing economic efficiency of the exploitation of agricultural landholdings with the account of the influence of different factors and conditions of functioning of economic entities themselves.

Based on the above, it follows that the complex assessment of the efficiency of the use of agricultural lands guarantees economists and financial analysts the opportunity to compare agricultural organizations, that have different specialization, range of activity and size, as it takes into account the land use efficiency, using all the assessment values at once [17-20].

In our opinion, the use of the proposed methodology will allow taking smart management decisions with the aim of the effective and rational agrarian land use.

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